Ministry of
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Vice-Ministry of
MINES & ENERGY

SUSTAINABLE ENERGY AGENDA

FOR PARAGUAY 2019-2023

Letter from the Vice-Minister

Energy plays a very important role in the development of a society. Just as human beings extract from food the energy necessary to function, the country's productive sector also needs to be nourished by what enables it to power its development.

Vehicles need gasoline or diesel to move, the national electrical system uses the movement of water to operate and different industries use different sources of energy according to their convenience. We have energy so built into our daily lives that we forget how necessary it is to move forward.

During this period, as Vice-Ministry of Mines and Energy, we proposed as a central objective, the development of a Sustainable Energy Agenda that would serve as a road-map for the actions to be taken during the next few years and to efficiently execute the National Energy Policy 2040.

Our main purpose was to build an Energy Agenda that was based on inter-sectoral dialogue. Therefore, as Vice-Ministry we convened different workshops to which we invited all the sectors and institutions that could have an impact on the implementation of the objectives of the Energy Policy.

In addition, we decided to include among our goals the need to strengthen the role of women in the energy sector, so we held a workshop with women representatives from different institutions in the energy sector in order to develop objectives that could be included within the Energy Agenda.

We believe that without this process of dialogue and prioritization, it would have been very difficult to achieve an Energy Agenda that meets the needs of all sectors of the country. The constant transformation that the energy sector is undergoing forces us to take into account the experiences of the different stakeholders, in order to shape a strategic and sustainable vision in the Energy Agenda.

It is time to give energy the importance it deserves, and use it to bolster the country's productive and social development. The objectives, goals, actions and all the content of the Energy Agenda have the following main objective:

Energy as an engine for the development of Paraguay!

Carlos Zaldivar Villalba
Viceminister of Mines and Energy

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ENERGY: NATIONAL CHALLENGES

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ENERGY: NATIONAL CHALLENGES

The binational hydroelectric developments on the Paraná River allow Paraguay to produce significant surpluses of electrical energy that are transferred, in the terms defined by the respective treaties, to the partner countries of both undertakings. The high level of hydroelectric generation in the country, together with the use of biomass for energy purposes, defines a local energy production that is 100% renewable: about 60% of primary energy production refers to hydropower, while the remaining 40% corresponds to biomass.

On the other hand, data from the National Energy Balance for 2018 show that the final energy consumption is not consistent with that of a renewable energy producing country. In the year 2018 the following percentages were verified: biomass 43%, hydrocarbons 41% and electric energy stood at only 16%.

The promotion of an energy transition towards a sustainable energy matrix, with consumption in line with energy generation, is one of the main objectives of the Sustainable Energy Agenda for Paraguay 2019–2023.

This Energy Agenda, which introduces new measures proposed by the current government in the framework of the National Energy Policy 2040 (PEN 2040), takes into account the sustainability criteria of the energy matrix, as well as the feasibility of the proposed measures. The approaches and priorities selected correspond to the short-term needs aligned with the vision of the PEN 2040.

PARAGUAY AND INSTITUTIONS IN THE ENERGY SECTOR

Although Paraguay is one of the largest producers and exporters of hydroelectric energy per capita, with an energy surplus, and a notable potential for generating energy from other renewable sources, it does not have an agency with the power to coordinate the energy sector and effectively promote the actions set out in the PEN 2040.

In order to guide public policies related to the energy field, the Undersecretaryship of Mines and Energy was created in 1990, as a dependency of the Ministry of Public Works and Communications (MOPC). However, since it does not have the functional level of a ministry, nor does it have broad legal powers in the energy sector, it has limited powers to coordinate inter-institutional efforts. This is evident, for example, in the difficulties in defining regulations to encourage the use of renewable energy resources and more broadly promote measures in the area of energy efficiency.

Paraguay finds itself in the peculiar situation whereby two of its major sources of electricity production are bi-national. These are the Itaipu (Paraguay and Brazil) and YACYRETA (Paraguay and Argentina) hydroelectric plants. For this reason, PEN 2040 proposes not only the creation of a governing ministry for the energy sector, but also the strengthening of the General Energy Resources Unit, under the Ministry of Foreign Relations, which is concerned with energy policy issues in the area of national and regional energy integration and interconnection. This is due to shared governance with the other partner countries of the binational entities.

AIMING FOR DEVELOPMENT

Despite the great availability of energy in hydroelectric power stations and the development of its transmission, the national industry – due, in part, to the great weight of the agro-industry and its predominantly thermal needs – is highly dependent on wood and biomass waste. Indeed, 84% of the energy consumed by the industrial sector is biomass. This makes it possible to observe some elements of interest. On the one hand, there is the restricted institutional capacity for the application of existing regulations to control deforestation; as well as budgetary and management limitations to carry out reforestation programs in a comprehensive manner. On the other hand, the relative scarce use of clean and abundant electrical energy is identified, as well as the difficulty of incorporating the chain of production and use of biomass in a sustainable process.

This scenario is due, in part, to the high relative costs of electricity versus biomass and the lack of incentives for upgrading equipment to balance costs. The objectives in energy efficiency as stated in the Energy Agenda, mean an initial boost that may lead to benefits in terms of growth of the industrial sector, job creation, increased Gross Domestic Product (GDP), among other major advantages that would result from the use of electricity in the country.

To expand the use of electricity in the country, one of the first measures in physical terms would be to consolidate the transmission and distribution infrastructure. Currently, the country does not have the capacity to access all its share of the electrical energy from its hydroelectric plants (the total installed capacity of the transmission system to access the energy from the binational plants is at 60% of what corresponds to Paraguay). In addition, there are constant difficulties with the distribution of electrical energy, which diminishes the appeal for greater investment in industries with electricity demands.

Electrical energy can also be used for the energy transition in the transport sector. Hydrocarbons are consumed nationally in the same magnitude as biomass, but unlike the latter, they are wholly imported. This represents a great weakness for the sector, due to the dependence on imported products and the international price of oil. 94% of the demand for hydrocarbons comes from the transport sector. In addition, this use represents approximately 80% of the Greenhouse Gas (GHG) emissions of the national energy sector.

Therefore, it is estimated that, with the incorporation of electric mobility, Paraguay could benefit in economic and environmental terms. The reduction of Carbon Dioxide (CO2) emissions would be accompanied by a greater use of clean electrical energy produced nationally. Additionally, it would be advisable to evaluate the use of hydrogen (H2) as a fuel for long distance transportation, since the characteristics of natural resources and energy production in Paraguay may favor the implementation of Green Hydrogen, considered a promising energy vector in an economy committed to mitigate the causes of climate change.

Source: ITAIPU

TOWARDS SUSTAINABLE FUELS

In 2018, hydrocarbons accounted for 41% of total energy consumption in Paraguay. This implies a total dependence on external sources of supply, commercial risks and prices, so a break in any of these factors could generate a strong impact on the country's economy. A transition to locally produced energy sources, developed with sustainability criteria, could allow the country to configure an energy matrix aimed at consolidating energy security.

In this sense, the PEN 2040 and the Energy Agenda propose giving priority to greater regulation of fossil fuels, considering their efficiency, quality, competitiveness and sustainability, the substitution of imported hydrocarbons for bioenergy, electricity and other sources of national origin, among other specific objectives.

For the development of biofuels, with respect to programs for blending bioethanol with gasoline, MIC (Ministry of Industry and Commerce) Resolutions No. 759/2017 and No. 507/2017 have been published, establishing the minimum percentage of anhydrous ethanol blend with 85, 90 and 95 octane gasoline.

It was established that 25% of mixtures for gasolines with a formula of less than or equal to 95 octanes should be maintained. On the other hand, regarding biodiesel mixing programs, Resolution No. 235 of the MIC has been issued, which regulates Decree No. 7412/06, and establishes the percentage of biodiesel blends with diesel of mineral origin. There are no specific programs for the development of raw material crops for liquid biofuels. The development of crops is mainly determined by market forces. Sugar cane, corn and other grains are mostly used to produce ethanol, although the use of sugar cane as an energy source is encouraged by the social impact it represents in the rural areas.

The PEN 2040 foresees, for the next decade, the integration of natural gas with a view to encouraging national production. In a first phase, natural gas could be imported from Bolivia or Argentina. It should be noted that this energy source is considered to have the least negative environmental impact among fossil fuels in the context of climate change.

With regard to the current market for petroleum products, it should be noted that in recent years Petróleos Paraguayos (PETROPAR) has significantly expanded its presence in the fuel retail market, which has contributed to price regulation. In addition, the return of this state-owned company to the Liquid Petroleum Gas (LPG) market and to hydrocarbon exploration activity is confirmed.

The measures outlined in the Energy Agenda, referring to the promotion of the use and production of biofuels in the country, could favor the sustainable development of the sector.

ENERGY THAT GENERATE JOBS

The use of the surplus hydroelectric generation that Paraguay is currently ceding to Brazil and Argentina, in return for monetary compensation (under the terms of the ITAIPU and YACYRETA treaties), is essential to the underpinning of industrial development in the country. These binational ventures provide clean, low-cost electricity for productive uses and for the general population. Regional productive integration will enable efficient use of available energy. In turn, it will be able to generate economic growth through industrial development and job creation.

In this sense, the core of energy and production integration is embodied in the objectives of the PEN 2040 and the Energy Agenda. The aim is to enhance the economic, social and energy security benefits of the integration projects, referring to the development strategy of International Gas Pipelines/Multipurpose Pipelines; or to enhance the efficiency in the production and commercialization of energy at the regional level.

Although in 2017 there was a rate increase in electricity, the rate remains the lowest in MERCOSUR, which benefits the development of the productive sector. The installation of the 500 kV Ayolas-Villa Hayes lines is definitely an extremely important step forward for the country, since it will bring about the modernization of the Paraguayan electrical system and the availability of electrical energy of adequate quality and quantity. In this regard, it is also worth highlighting the work of the National Electricity Administration (ANDE) in the preparation of the Master Plan for the 2018-2025 period for the National Electricity Transmission and Distribution System, with works to be executed in the different departments of the country.

In order to boost productive development, Paraguay was awarded a loan from the Green Climate Fund (GCF) and the Inter-American Development Bank (IDB), to promote investment projects in energy efficiency in small and medium companies in the industrial sector, and thus contribute to improving competitiveness and job creation, as well as reducing GHG emissions by supporting compliance with the Nationally Determined Contributions (NDC), by Paraguay, in the Paris Agreement.

The Energy Agenda proposes regulatory measures and investment in adequate infrastructure to achieve an energy integration that fosters the country's productive development.

HEALTHIER AND MORE EQUITABLE ENERGY ENVIRONMENT

Paraguay's residential and commercial sector is second in terms of net energy consumption in the country. According to data from the Directorate-General for Statistics and Census (DGEEC), one third of households cook food with solid biomass, and the use of electricity for this purpose is still limited.

According to data from the General Directorate of Statistics and Census (DGEEC), in one third of households, food is cooked with solid biomass; and the use of electricity for the purpose of cooking is still limited. However, when it comes to useful energy, electricity is the main source consumed, with 34.3% of total useful consumption, firewood with 23.9%, and then only in fourth place is diesel with 13.9%, in accordance with its low average yield.

In the residential and commercial sector, 71% of net energy consumption is represented by firewood and charcoal (2018 data). It should be noted that the second most relevant source in this sector is electricity, with 22% of net energy consumption and a 60% share in useful energy consumption. The analysis also reveals that the levels of economic income per family are inversely proportional to the consumption of firewood and charcoal for cooking food.

On the other hand, it is important to emphasize that, historically in Paraguay, no measures of efficient and rational use of energy were promoted. In the electricity consumption sector, this was mainly due to the abundant availability of hydroelectricity and the fact that public policies focused on increasing the coverage of the electricity service to the national population.

Biomass is a renewable source of energy and physical conditions exist in the country for its sustainable use. The transition to the use of electric energy will depend on the reliability and access to this energy throughout the country; in addition to the implementation of policies that encourage the use of more efficient and clean cooking systems that will help improve air quality and people's health.

It is here that the aspects related to the affordability of energy for the entire population will be developed. Measures are proposed to reduce energy poverty, through the energy transition in the cooking of food. Other social aspects included in the development of this area are related to the improvement of the quality of life of the native peoples, as well as the greater integration of women in the energy sector.


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STRUCTURE OF THE AGENDA

Paraguay's Sustainable Energy Agenda 2019–2023 is divided into five pillars, which are based on energy efficiency and sustainability and seek to enhance energy security and the country's socioeconomic development.

The structure proposed in the Energy Agenda aims to cover all the areas with a predominant role in the national energy sector and to establish a roadmap that will allow the drawing up of objectives in the short term.

The five pillars, based on the historical background and characteristics of Paraguay's energy sector, are as follows:

Energy security and development

1 **ENERGY GOVERNANCE**
To strengthen the institutional coordination of the sector and the capabilities of actors

2 **RENEWABLE SOURCES AND ELECTRICITY DEVELOPMENT**
It aims to promote a more sustainable Energy Matrix, with greater use of electrical energy

3 **BIOENERGY AND FUELS**
It proposes to foster the transition to sustainable fuels through the promotion of national energy sources.

4 **ENERGY AND PRODUCTIVE INTEGRATION**
It seeks to promote progress in the sustainable use of shared energy resources and in the use of energy for the development of the national productive sector, in an environment favorable to the regional integration of value chains.

5 **ENVIRONMENT AND SOCIETY**
It aims to ensure access to affordable and sustainable energy, with women's empowerment, inclusion and citizen participation.

Energy efficiency and sustainability

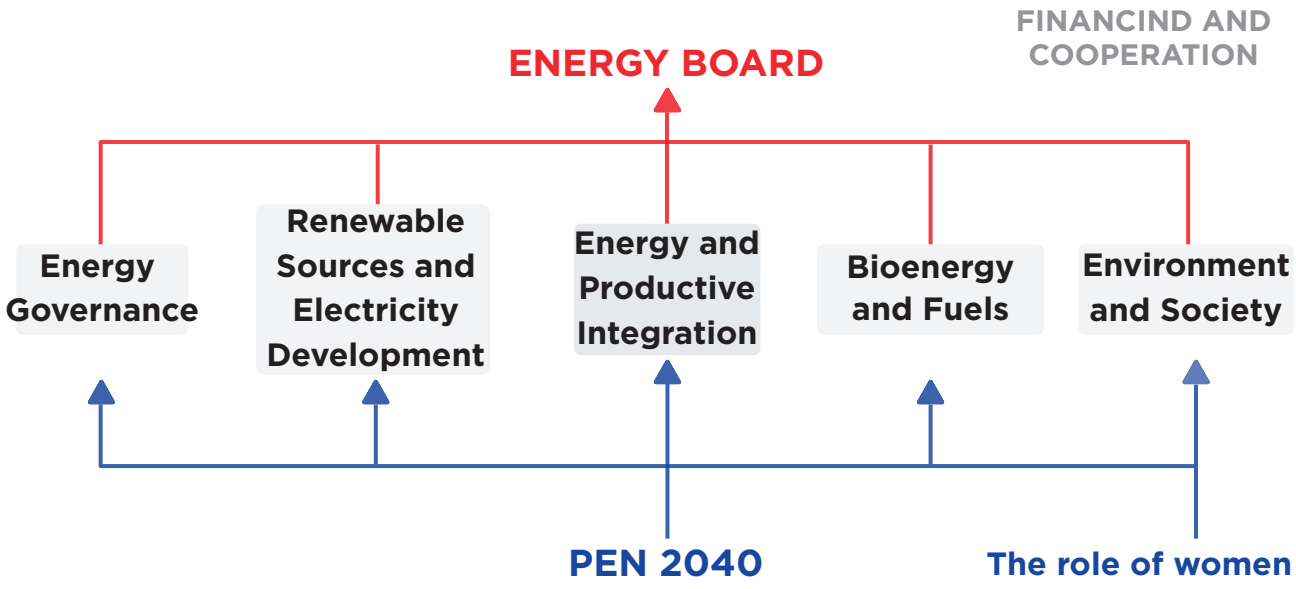
PARTICIPATORY PROCESS

The Energy Agenda 2019–2023 is the roadmap that will allow, in the short term, the strengthening of the energy sector through government management, with criteria of sustainability, energy security, development and energy efficiency, in addition to considering the relevance of social and environmental aspects.

The process of building the Energy Agenda has been based on the participation of different institutional actors and the consideration of various functional aspects of the national energy sector. The initiative was led by the Vice-Ministry of Mines and energy (VMME) and it has established priority objectives and measures to be taken in the coming years. It was of great importance to have the participation of actors from all sectors related to the energy value chain as well as users: public sector, private sector, civil society, including academia, unions, NGOs, among others.

To achieve representativeness of all sectors, a participatory working methodology was designed that included all interested parties through workshops and interviews. They were given qualitative tools that allowed participants to identify priorities according to their perceived needs, as well as actions to be taken into account in the 2019–2023 period.

This dialogue allowed the drafting of a representative Energy Agenda, useful for the citizenship and technically correct to outline the roadmap for the public institutions of the national energy sector. This document does not replace national strategic and operational plans, but is presented as a public policy instrument with a guiding role.



The participatory process was divided into three stages: the first stage corresponded to the work of the Focus Group for the Generation of Objectives and Goals; the second stage involved the work of the Focus Group for the Validation of Proposals; and the third stage involved the activities of the Final Focus Group. The three stages represented different processes.

FINAL FOCUS GROUP
Revalidation and approval of the objectives and goals prioritized in the previous groups.

VALIDATION FOCUS GROUP
Prioritization of objectives and goals. Validation of the updated SWOTs.

GENERATION FOCUS GROUP
Diagnosis and analysis. Goal generation. Updating of the SWOT.

1 **stage**
GENERATION FOCUS GROUP
Whose main objective is to generate the basic content of the Energy Agenda.

Is made up of two parts

→ The **PEN 2040** (National Energy Policy 2040)
the **Role of women**

The main objective of this stage, corresponding to the Generation or Proposal Focal Group, was to generate the basic content of the Energy Agenda, through a participatory exercise, in which the various actors linked to the energy sector were represented.

The proposal phase included the analysis and discussion of the objectives and targets of the PEN 2040. It should be noted, that because this policy does not explicitly present the integration of women in the energy sector, elements that address the role of women in all areas of the national energy sector have been incorporated into the Energy Agenda.

These elements were systematized based on the results of a specific focus group whose purpose it was to propose objectives and goals for greater integration of women in the sector. About 30 women from all sectors of the public sphere and civil society have participated, yielding relevant results.


PROFORESTAL

2 stage

VALIDATION FOCUS GROUP

At this stage, the goals and objectives which were obtained in the previous stage were presented; these were organized according to their level of priority (importance and urgency) with their respective indicators.

For this purpose, a workshop was held with the participation of about 70 experts from different sectors of the energy field. National authorities, leaders of business associations, academic directors of universities, senior officials from ANDE, the Ministry of Women's Affairs, VMME and PETROPAR, as well as members of indigenous associations, among many others, contributed to the development of a representative Energy Agenda.

3 stage

FINAL FOCUS GROUP

Finally, in the final stage, under the coordination of the Secretariat of the Cabinet of the Presidency of the Republic, the proposal of objectives, goals and actions was approved and systematized based on the results of the previous stages. This final exercise was carried out by the National Energy Board, whose function it is to advise and set the general guidelines for the development of the national energy sector.

PRIORIZATION OF OBJECTIVES

For the prioritization of objectives, work was carried out with groups from all areas of the country's energy sector. As a final result, the Energy Agenda presents, within each objective, the goals categorized as priority and relevant.

The process to obtain these results was carried out through the application of the Eisenhower Matrix. This involved dividing the proposed components according to their range of importance and urgency, at the levels of: "Important and urgent"; "Important, but not urgent"; "Urgent, but not important"; and, "Neither important, nor urgent".

Subsequently, the components that belong to the category of:

"IMPORTANT AND URGENT"	are classified as →	PRIORITY
"IMPORTANT BUT NOT URGENT" **"URGENT BUT NOT IMPORTANT"**	are classified as →	RELEVANT
"NEITHER IMPORTANT NOR URGENT"	are relegated from →	FINAL RESULT

In the systematization of results, we proceeded to identify the 10 Macro-commitments of the energy sector for the year 2023. These Macro-commitments guide the organization and presentation of objectives, goals and actions

THE 10 MACRO-COMMITMENTS

1. Increase the government's coordinating capacity in the energy sector to promote institutional synergy towards common objectives

2. Strengthen institutions in the energy sector in order to seek to ensure access to affordable, safe, sustainable and modern energy for the entire population.

3. Guarantee electrical development with national system quality standards, by strengthening the ANDE and the participation of independent energy producers and transporters.

4. Strengthen and accelerate the process of conversion of the energy matrix towards a sustainable matrix, promoting the development of renewable energy sources.

5. To promote the integration and efficient use of bioenergy in the different segments of the national energy matrix, through the formalization of the solid biomass market and the promotion of biofuels.

6. Promote the exploration, industrialization, transportation, distribution, storage and commercialization of hydrocarbons, in order to guarantee the supply following criteria of efficiency and quality.

7. Strengthen the systematization of quality energy information management, as a basis for energy policy and planning.

8. Promote the development and use of hydroelectric generation as one of the foundations of the productive sector and the consolidation of the country's privileged position in regional energy integration.

9. Establish a system of monitoring, reporting and verification that seeks to mitigate the effects of climate change in view of the international commitments undertaken by the country.

10. Raise awareness, including measures in formal education, about the importance of energy efficiency and the value and role of women in the sector.

ENERGY GOVERNANCE

02
Chapter

ENERGY GOVERNANCE

Energy is essential for the development of societies. It is present in human activities, in most of the world's current challenges and opportunities, such as: food production, employment generation, industrialization, transportation and essential services for society. According to the Sustainable Development Goals, it relates to environmental aspects, climate change and air quality, among things. For this very reason, energy cannot be treated in isolation but must be approached with a broad and comprehensive vision.

In Paraguay there exists a large production of clean and renewable energy. However, energy must be used in such a way that it can be transformed into development. The objectives seek the strengthening of institutions and their commitment to ensure compliance with the objectives defined for the energy sector, which requires clear planning and public policies.

The importance of energy for the different spheres of society, the relevance related to the energy produced and the need to coordinate actions among the country's institutions suggest the creation of a leading and coordinating institution in this sector. This was identified as one of the most urgent goals in the PEN 2040.

Source: ANDE

OBJECTIVES, ACTIONS, GOALS AND RESPONSIBLES PARTIES

1 Coordination of the Energy Sector

1.1 Establishment of a legal framework that favors the development of the energy sector through the creation of the Ministry of Mines, Energy and Hydrocarbons.

Priority target:

- To have the Ministry of Mines, Energy and Hydrocarbons, established and in operation. The responsible actors are the National Energy Board, the National Congress and the Executive Branch.

2 Strengthening of Institutional Capabilities of the Central Administration in Energy Integration

2.1 Strengthening of the General Energy Resources Unit of the MRE.
2.2 Training of Ministers/Advisers on hydroelectric (Energy) issues.

Priority targets:

- To have, in the short term, a Plan for Strengthening the General Energy Resources Unit of the Ministry of Foreign Relations. The responsible actors are the Executive Branch, the Vice-Ministry of Mines and Energy, the Ministry of Foreign Relations, the Permanent Commissions of the National Congress and the Paraguayan-Argentinean Joint Commission. .
- To have Ministers/Advisors with expertise in hydroelectric and energy issues in strategic embassies in the short term.

3 The strengthening of energy regulation

3.1 Signing of the ANDE management contract with the National Council of Public Companies (CNEP).
3.2 Signing of the PETROPAR management contract with the CNEP.

Priority targets:

- In the short term, perfect the ANDE management contract with the CNEP, where the responsible actors are the ANDE, the CNEP and the VMME.
- In the short term, perfect the management contract of PETROPAR with the CNEP where the responsible actors are PETROPAR, the CNEP and the VMME.

4 Strengthening of the VMME

4.1 Updating the legal framework for biomass ,
4.2 Implementation of Decree 4056, which establishes certification, control and promotion schemes for the use of bioenergy.
4.3 Implementation of energy efficiency projects, such as improved kitchens in rural communities.

Priority targets:

- To reduce deforestation in the national territory, the adverse effects on biodiversity and the illegal use of bioenergy sources.
- To avoid increasing greenhouse gas emissions, sustain competitiveness in the agroindustrial production sector and promote the diversification of rural production units with combined activities such as agroforestry, silvopastoral and agroforestry systems; in joint action with other institutions.
- To ensure national energy autonomy through the provision of sustainable energy sources.
- To reduce the use of firewood in the most unprotected rural sector, through the introduction of improved and more efficient stoves, which will significantly improve the health conditions of these populations.

5 Establishment and operation of independent electricity production and transmission from renewable sources

5.1 Enactment of the new Independent Power Generation and Independent Power Transmission Act.
5.2 Regulation of the Independent Power Generation and Independent Power Transmission Act.

Priority targets:

- Have a new Independent Power Generation and Independent Power Transmission Act enacted in the short term. The responsible actors are the MOPC, the ANDE, the Legislature and the VMME
- To have a Regulation of Power Generation and Power Transmission issued by decree in the short term. The responsible actors are the MOPC, the ANDE, the VMME and the Executive Branch.

6 Legal structure that favors the development of national Hydrocarbons

6.1 Creation and approval of a new Hydrocarbons Law.

Relevant target:

- To have a new Hydrocarbons Law drafted and passed in the short term. The responsible and interested actors are the Executive Branch, the National Congress, PETROPAR and the VMME

7 Energy efficiency governance

7.1 Regulation and enforcement of a law with general guidelines for the rational and efficient use of energy.
7.2 Availability of state funding for energy efficiency projects and studies.
7.3 Creation of Internal Energy Conservation Committees (CICE)
7.4 International cooperation on energy efficiency issues.

Priority targets:

- To have a regulated law in effect in the short term, which allows the rational and efficient use of energy. The responsible actors are the National Committee for Energy Efficiency (CNEE), the National Congress, the Executive Branch, and the VMME.
- To have state funding available in the short term for the execution of projects and studies on Energy Efficiency. The responsible actors are the CNEE and the VMME.
- To have international cooperation mechanisms in place in the short term. The responsible actors are the CNEE and the VMME.

Relevant goals:

- To have Internal Energy Conservation Committees (CICE) in public and private companies, established and operating in the short term. The responsible actors are the CNEE, the Unions of Commercial and Industrial Companies and the VMME.
- To have the areas of interest for international cooperation prioritized in the short term. The responsible actors are the CNEE and the VMME.

8 Energy efficiency in buildings (residential, commercial, industrial and public)

8.1 Approval of regulations for mandatory energy labelling of power-consuming products.

Priority target:

- To have a mandatory energy labelling regulations for power-consuming products approved in the short term. The responsible actors are the CNEE, the National Institute of Technology, Standardization and Metrology (INTN) and the VMME..

9 Creation of the Integrated National Energy Information System

9.1 Execution of the Plan for Strengthening the National Energy Information Sys-teml.

Relevant target:

- To have the Plan for Strengthening the National Energy Information System, in operation, in the short term. The responsible actors are the VMME and the CNEE..

10 Strengthening of Energy Planning

10.1 Execution of the National Energy Outlook

10.2 Implementation of the program of continuous professional development in energy planning tools.

Priority targets:

- To execute in the short term, the National Energy Outlook 2050 through the VMME

- To have a program of continuous professional development in energy planning tools implemented in the short term. The responsible actors are the Public Universities together with the VMME, including agreements with international institutions.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RENEWABLE SOURCES AND ELECTRICITY DEVELOPMENT

03
Chapter

RENEWABLE SOURCES AND ELECTRICITY DEVELOPMENT

The sectoral diagnostic studies for the National Energy Policy 2040 pointed out the contradiction in the national energy matrix, in terms of energy supply and demand. Firstly, the energy matrix in terms of supply, emphasizes the production of renewable sources, divided into hydropower and solid biomass. On the demand side, however, biomass and hydrocarbons prevail, while electricity accounts for only 16%.

The Energy Agenda proposes an energy transition that seeks to promote renewable sources and those produced in the national territory, as opposed to the current predominance of imported fuels.

The diversification of the energy matrix, promoting the electrification of sectors such as transport and industry, are the main challenges to be overcome. The benefits to be achieved will not only be environmental, but also economic; which are presented as development opportunities for the country.

Due to the significant evolution in the demand for hydrocarbons in the country's transportation sector in recent decades, this sector is a great opportunity for the implementation of public policies that promote the transition to sustainable mobility, which will lead to the replacement of imported fuel for energy produced in the country.

Paraguay will enjoy a favorable demographic advantage in the coming years. This historic window of opportunity, in conjunction with other developments, would allow for the promotion of electricity development in Paraguay, and consequently, greater job generation, increased income at the macro and micro levels, and long-term sustainable development.

Source: ITAIPU

OBJECTIVES, ACTIONS, GOALS AND RESPONSIBLE PARTIES

1 Strengthening the transmission and distribution infrastructure in the national electricity sector

1.1 Execute the National Technology Program for demand management. .
1.2 Apply a system for execution monitoring for the control of the management of the execution of the ANDE Master Plan.

Priority target:

- Execute the National Technology Program in the short term for the Management of Demand, including a Pilot Plan for Intelligent Networks. The responsible actors are the ANDE, the Technical Planning Secretary (STP) and the VMME.

Relevant goals:

- Have a monitoring system for the control of the Management of the Execution of the ANDE Master Plan in the short term. The responsible actors are the ANDE, the STP and the VMME.
- To have a Management System for the Execution of the ANDE Master Plan for Generation in the short term. The responsible actors are the ANDE, the STP, the MOPCE and the VMME

2 Characterize and enhance the use of renewable energy resources and alternatives, and energy efficiency in the transport sector

2.1 Develop Regulations and Standards for Electric Mobility.
2.2 Implement Hydrogen Fleet Evaluation Program.
2.3 Establish free recharging points and parking lots for electric vehicles.
2.4 Implement vehicle fleet modernization program.

Priority targets:

- To have the Regulations and Standards for Electric Mobility drafted in the short term. The responsible actors are the ANDE, the STP, the MOPCE and the VMME.
- To have the Hydrogen Fleet Evaluation Program developed in the short term. The responsible actor is the VMME.
- Implement a pilot project for the use of Green Hydrogen in the country. The responsible actors are the VMME and the state-owned energy companies, with the participation of the private sector.
- To establish free charging points and parking spaces for electric vehicles in Asunción and the Metropolitan Area, which will be operational in the short term. The responsible actors are the Municipal Authorities in collaboration with the VMME.

Relevant goals:

- To bring the ANDE urban vehicle fleet in the Asuncion metropolitan area to 10% electric. The interested parties are the Vice-Ministry of Transport (VMT), the ANDE and the VMME. .
- To Bring the fleet of new vehicles in the public sector to 10% electric. Where the relevant actors are the VMT, the ANDE and the VMME.
- To have a Vehicle Fleet Modernization Program with greater energy efficiency implemented in the short term. The responsible actors are the CNEE and the VMME.

3 Characterizing renewable and alternative energy resources

3.1 Develop an atlas of the potential of Water Resources.
3.2 Develop an atlas of the potential of Wind and Solar Resources.
3.3 Develop atlas of the potential of biomass resources.

Priority target:

- To have the atlas of the potential of water resources and the atlas of the potential of wind and solar resources produced in the short term. The responsible actor is the VMME together with the Ministry of Environment and Sustainable Development (MADES).

Relevant target:

- To have the atlas of the potential of biomass resources produced in the short term. Also, the responsible actor is the VMME in conjunction with the National Forestry Institute (INFONA) and the Ministry of Agriculture and Livestock (MAG).

4 Ensure access to financial resources for renewable energy development, energy efficiency and energy quality improvements

4.1 Use national development funds for renewable energy projects.
4.2 To offer through financial institutions lines of credit for energy efficiency.
4.3 Implement a non-technical loss reduction plan.

Priority targets:

- To use the National Funds for the development of Renewable Energies (AFD Lines) in two renewable energy projects in the short term. The responsible actors are the Financial Agency for Development (AFD) and the VMME.

- To have Lines of Credit for Energy Efficiency offered by financial entities. The responsible and interested actors are the AFD, the Ministry of Finance (MH) and the VMME.
- Develop and implement the plan to reduce non-technical losses (10% reduction) in the short term, where the responsible actors are the ANDE and the VMME.

5 Encourage the participation of independent producers and distributed generation in the national electricity system

5.1 Apply distributed generation regulations.
5.2 Apply regulations for energy transactions with independent producers.

Relevant goals:

- To establish the ANDE distributed generation regulations, and have it be in effect in the short term. The responsible actors are the ANDE, and the
- To establish regulations for energy transactions with independent producers, and have it be in effect in the short term. The responsible actors are the ANDE, and the VMME.

6 Promote the use of sources based on bioenergy, solar energy, wind energy and other alternative sources, based on sustainability criteria

6.1 Implement solar collector projects for water heating in the public sector
6.2 Implement photovoltaic and/or wind generation projects.

Relevant goals:

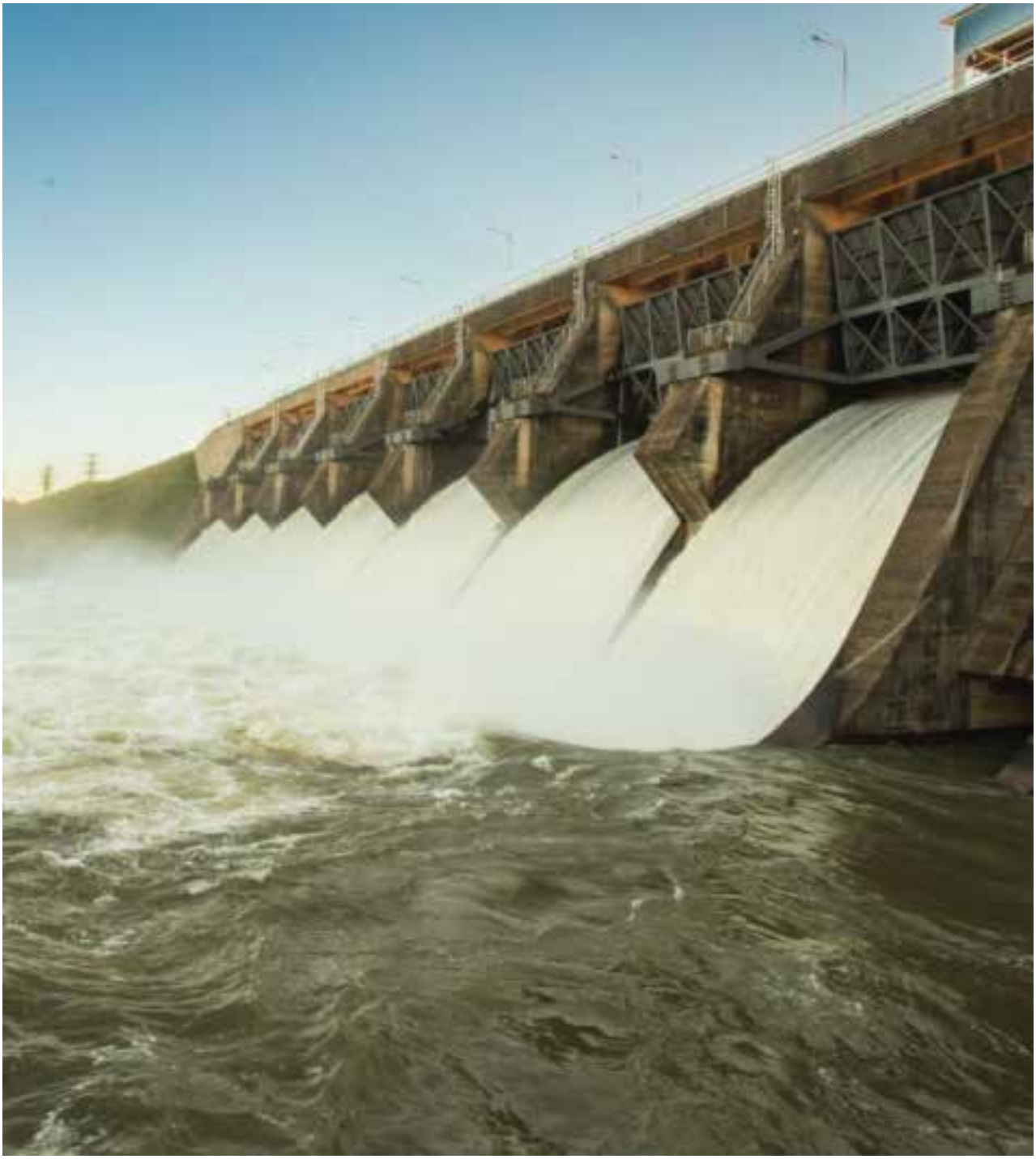
- Implement six (6) solar collector projects for water heating in the public sector, in the short term The responsible actors are the Ministry of Public Health and Social Welfare (MSPyBS), the Institute of Social Security (IPS) and the VMME.
- To have at least one (1) photovoltaic and/or wind generation project in service in the short term. The responsible actors are the ANDE, and the VMME.

7 Promote the national production of supplies, services and technology for the use of bioenergy and other alternative sources

7.1 Define and implement a competitiveness strategy for suppliers of goods and services in the energy sector

Relevant target:

- To have a strategy of competitiveness for suppliers of goods and services in the energy sector defined and implemented. The responsible actor is the VMME.



BIOENERGY AND FUELS

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Chapter

BIOENERGY AND FUELS

The National Energy Balance for the year 2018 indicates that the final energy consumption is supplied by 43% biomass, mostly obtained from unsustainably managed forests. Regarding liquid biofuels, Paraguay has had success in the development of the ethanol industry, which is based on the technology used by vehicles. However, the development of biodiesel slowed down, mainly due to the low price of diesel.

All the outlined measures seek to enhance the integration and efficient use of bioenergy in the different segments of the national energy matrix, through the formalization of the solid biomass market, the promotion of biofuels and the effective participation of interest parties. In addition, the aim is to promote the exploration, industrialization, transport, distribution, storage and commercialization of hydrocarbons, in order to guarantee the supply and efficient use of these under criteria of efficiency and sustainability.

To achieve the proposed goals, the joint work of various identified actors will be required, such as: the VMME, the MAG, the INFONA, the MIC, PETROPAR, the INTN, the National Directorate of Public Procurement (DNCP), the National Council of Science and Technology (CONACYT), Banks of the National Financial System and Civil Society Organizations.

Source: PETROPAR

OBJECTIVES, ACTIONS, GOALS AND RESPONSIBLE PARTIES

1 Promote bioenergy-based sources based on efficiency and sustainability criteria

1.1 Formalization of the solid biomass market that strengthens producers and consumers with instruments that guarantee the development of bioenergy.
1.2 Promotion of biofuels for their development based on sustainability criteria.
1.3 Participation of economic agents and interest groups in the development of bioenergy.

Priority targets:

- To have a legal instrument regulated and operational in the short term to regulate the solid biomass market. The responsible actors are civil society organizations, the MADES, the MIC, the STP, the INFONA and the VMME.
- To have a financing mechanism for forestry projects in place with repayment terms that are more suited to the producer. The responsible actors are the AFD, the STP (the PROEZA Project – Poverty, Reforestation, Energy and Climate Change), the National Development Bank (BNF), Intermediate Financial Institutions (IFIs), the INFONA and the VMME.
- To have a plan to strengthen medium and large producers of solid biomass. To have in place at least 130,000 hectares of energy forests, in the short term. The responsible actors are the GCF, the international bank, the STP, the MH, the INFONA and the VMME.
- Develop a reforestation program for energy purposes for small producers. Issuance of differentiated guides/certificates for small producers Those responsible are the INFONA, the MADES, the STP and the VMME.
- To have a solid biomass certification plan and introduce incentives according to the scale of consumption of certified solid biomass. The responsible actors are the MIC, the MADES, the INFONA, the STP, the Paraguayan Timber Federation (FEPAMA), the Federation of Production, Industry and Commerce (FEPRINCO), the Paraguayan Chamber of Oilseed and Grain Processors (CAPPRO), the Paraguayan Industrial Union (UIP), the National University of Asunción (UNA), and the VMME.
- To have a program of biodiesel–diesel mixtures in operation, which allows a mixture of 3% to 5%, in the short term. The responsible actors are the MIC, PETROPAR, the INTN and the VMME.

- To have in place a program to promote the use of biofuels in public transport and cargo transportation. The responsible actors are the MIC, PETROPAR, the INTN and the VMME.
- To implement the plan to renew the public sector vehicular fleet with Flex vehicles executed at 30% in the short term. The responsible actors are the DNCP, the MIC and the VMME.
- To implement the gasoline/bioethanol blending program. Execute in the short term 27% and preserve in the long term for ≤ 85 octane. The actors responsible for this goal are the MIC, PETROPAR, the INTN and the VMME.
- Execute at 100% the program to expand the production capacity of the Mauricio José Troche alcohol plant. The responsible actors are PETROPAR and the VMME.

Relevant goals:

- Develop and define standards and regulations for the quality and efficient use of biomass The responsible actors are the INTN, the MADES, the MIC, the STP, the INFONA and the VMME.
- To have, partially implemented, the 2018–2023 Plan for the development of biofuel (ethanol and biodiesel) infrastructure, in which the responsible actors are the MIC, PETROPAR, and the INTN.
- Develop a raw material crop development program for liquid biofuels implemented in the short term. The responsible actors are the MAG, and the MIC.

2 Strengthen the hydrocarbons sector with competitive and efficient participation of public companies, economic agents and interest groups

2.1 Participation of PETROPAR in all activities of the hydrocarbon value chain, at the national level.
2.2 Strengthening of PETROPAR's infrastructure for the supply of hydrocarbons
2.3 Participation of economic agents and interest groups in the development of national hydrocarbons
2.4 Management of hydrocarbon information and documentation in Paraguay
2.5 Promotion of R&D activities in conjunction with the training of specialized human resources within the hydrocarbon sector.

Priority targets:

- To have the Expansion Program in the distribution and commercialization of fuels executed. For this, the responsible actors are PETROPAR and the MIC.

- Execute a commercial strategy that seeks to increase PETROPAR's participation in the liquid and gas fuels market. The responsible and interested actors are the MIC and PETROPAR.
- Execute in the short term the Investment Plan for exploration and development of hydrocarbons at PETROPAR. For its execution, the responsible actors are PETROPAR and the VMME.
- Accompany this with a System of Management, Monitoring and Correction of deviations PETROPAR's Investment Plan for exploration and development of hydrocarbons. The responsible actors are PETROPAR and the VMME.
- To have a fuel traceability system implemented in the short term. The responsible actors are the MIC and PETROPAR.
- To strengthen the supply of hydrocarbons through the execution of the National and International Port Infrastructure Program. The responsible actors are PETROPAR and the National Administration of Navigation and Ports (ANNP).
- To create and operate the National Center of Information and Documentation for the development of hydrocarbons in the short term. The responsible actors are the MIC, PETROPAR and the VMME.

Relevant goals:

- To monitor, evaluate and adjust the Infrastructure Investment Plan for PETROPAR's biofuel supply in the short term. The responsible actors are PETROPAR and the MIC.
- To follow up the strategy for PETROPAR's association with companies in the sector or in the Hydrocarbon area. The responsible actors are PETROPAR and the MIC.
- Execute in the short term the Investment Program for River Transportation, in order to strengthen the infrastructure for the supply of hydrocarbons. The responsible actors are the VMT, PETROPAR, the ANNP and the VMME.
- To have an Incentive Program for Research Projects related to hydrocarbons implemented in the short term. The relevant actors are the MIC, Universities, the CONACYT, PETROPAR and the VMME.
- To train, through programs, human resources highly specialized in hydrocarbons. The responsible actors are the MIC, Universities, and the CONACYT.


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ENERGY AND PRODUCTIVE INTEGRATION

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ENERGY AND PRODUCTIVE INTEGRATION

Energy and productive integration could mean for the country the possibility of boosting its development through the productive use of national energy resources, positioning it as a regional center for the exchange of energy. In this sense, it is important to manage all the information involved in strengthening planning efforts, both in the energy sector in general and in the national electricity sector.

Planning is key since it allows for the determination of the measures, goals or investments to be projected over a period of time, which will be oriented towards the fulfillment of specific long-term objectives, such as a regional energy exchange. Furthermore, to strengthen integration, a set of complementary activities is required, ranging from the management of the country's electricity demand, to innovative solutions to boost the use of surplus hydroelectricity, such as, for example, through the energy transition of the transport sector, by means of electromobility.

Another fundamental aspect for this issue is the definition of the guidelines for the negotiations related to the binational entities (ITAIPU and YACYRETA). In this sense, the importance of having a strategy to assist in the negotiations related to ITAIPU is an urgent and important factor, given the proximity of 2023, when the High Contracting Parties (Paraguay and Brazil) must agree on the new guidelines of Annex C of the Treaty. This strategy must be well designed and must take into account its implications with the definition of alternatives that allow the promotion and strengthening of energy integration between both parties, through terms and conditions adapted to current needs. At the same time, it will be necessary to formulate an electricity marketing plan for both parties, defining, among other issues, aspects related to the cost of the electricity service and infrastructure for the use of energy for the development of the countries.

Finally, the country's energy needs, which have grown at significant rates in recent years, require measures that can be directed towards the use of water resources shared with other countries, in order to continue expanding generation capacity.

OBJECTIVES, ACTIONS, GOALS AND RESPONSIBLE PARTIES

1 Consolidate institutional coordination with powers and resources for policy formulation, planning, regulation and oversight

1.1 Execution of the Plan to Strengthen the National Committee on Statistics and Energy Planning.

Priority target:

- To implement the Plan to Strengthen the National Committee on Statistics and Energy Planning in the short term. The responsible actor is the VMME.

2 Systematize the management of data, information, documentation and lessons learned from the National Energy Sector

2.1 The strengthening of Energy Planning.
2.2 Systematization of the data management of the National Energy Sector.

Priority targets:

- Implement the Energy Planning Training Program in the short term. The responsible actor is the VMME.
- To have a National Electricity Development Plan 2020–2040 in place. Responsible actors: the ANDE and the VMME.

Relevant goals::

- Implement the monitoring system for the execution of the established energy sector plans. Responsible actor: the VMME.
- To have available the organized documentary database of the binational projects in operation and in the pre-investment phase in the short term. Responsible actors: Binational entities and the VMME.
- To design a regional energy exchange model in the context of the Southern Cone Energy Market (MECS). The responsible actors are the Energy Board, the ANDE and the VMME.

3 To promote the Integral Management of Electricity Demand and programs for the promotion of electricity in the energy matrix

3.1 Promotion of Electricity in the Energy Matrix and integrated demand management.

Priority target:

- Implement a program in the ANDE for the Integral Management of Demand and establishing as an indicator of success a load factor of 65% in the short term. For which, the responsible actors are the ANDE and the VMME.

4 To define in a timely manner the conditions for the commercialization of energy from the Binational Hydroelectric Power Plants, taking into account the national public investment needs and the country's socioeconomic development programs

4.1 Determination of guidelines for negotiations regarding the governance of Binational Entities based on national interests of economic growth, productive development and social progress.

Priority target:

- Have a strategy on behalf of the High Contracting Party – Paraguay for the revision of Annex C of ITAIPU 2023, approved and available to negotiators. The responsible actor is the Executive Branch.

Relevant goals:

- Establish the national strategy for the revision of Annex C of the ITAIPU Treaty, based on the studies and proposals of the Negotiating Team and its Working Groups. The responsible actors are the Energy Board, the MRE, the MOPC, the Negotiating Team and its Working Groups.
- Promote spaces for citizen consultation and participation aimed at disseminating accurate information on the scope and importance of renegotiation, seeking to build consensus at the level of public opinion. The responsible actor is the VMME.
- Accompany and advise, as appropriate, on the renegotiation. The responsible actors are: The Legislative Power, through the Bicameral Commission of the Congress and the Ad Honorem Advisory Commission of the Ministry of Foreign Relations.
- Carry out studies on the possibilities of commercialization of Paraguayan electrical energy in the region's electrical markets, aiming at strengthening energy integration in the Southern Cone of the Americas. The responsible actors are the Energy Board, the MRE and the MOPC through the VMME.

5 Improve the use of the hydroelectric power potential of the hydrographic basins shared with neighboring countries, respecting social and environmental responsibility

5.1 Review and validation of legal instruments for the development plan of the Paraná hydroelectric complex in the international segment of Paraguay and Argentina.

Priority target:

- To have the Strategic Energy Marketing Plan for Paraguay generated by Itaipu Binacional approved. The responsible actors are the National Energy Board, the MRE, the ANDE, and the VMME.

Relevant target:

- Obtain legal instruments ratified by Paraguay and Argentina that allow the execution of the HE Paraná Py–Arg Complex in the short term. The responsible actors are the National Energy Board, the Executive Branch, the MRE and the VMME.

6 Develop mechanisms to collaborate in mitigating the hydrological risks of the Paraná River Basin

6.1 Hydrological risk management of shared resources.

Relevant target:

- To have an operating observatory of the hydrological behavior of the MECS basins. The responsible actors are the National Energy Board, the MRE, the VMME and the National Directorate of Civil Aeronautics (DINAC).

Source: EBY


VEHÍCULO ELÉCTRICO
CERO EMISIÓN
ITAIPU BINACIONAL
GOBIERNO NACIONAL
ITAIPU BINACIONAL
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ENVIRONMENT AND SOCIETY

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ENVIRONMENT AND SOCIETY

According to data from the DGEEC, 99.5% of households in Paraguay have access to electricity. However, it is essential to ensure affordability over time for the entire population, and at the same time, to promote renewable and clean sources of energy. According to the Sustainable Development Objectives, expanding infrastructure and improving technology in order to have clean energy can, in addition to helping the environment, stimulate the country's growth.

Energy efficiency aims to reduce the amount of energy required to provide certain products and services. In this area, it is considered appropriate to raise awareness and train the population on energy issues, thus increasing the dissemination of the term energy efficiency. This measure would aim to involve the population in the process of a long-term energy transition.

It should also be noted that developing strategies to deal with the phenomenon of climate change is becoming increasingly important. Part of these strategies involves the use of clean energy. Some energy sources, such as the burning of fuels or coal, are considered to be the largest contributors to the emission of greenhouse gases. Therefore, it is necessary to have a monitoring, reporting and verification system in place in order to mitigate their emissions.

It is also considered essential to address important social issues, such as empowering women in the energy sector and the energy needs of indigenous peoples.

Source: MOPC

OBJECTIVES, ACTIONS, GOALS AND RESPONSIBLE PARTIES

1 In energy projects, promote mitigation and adaptation to the effects of climate change, as well as the implementation of environmental services

1.1 Mitigation of GHG emissions in the energy sector.

Priority targets:

- To have a National Strategy for Sustainable Mobility that encourages the use of electric energy in various forms, including electric, hybrid and hydrogen vehicles (the latter through experimental or demonstration projects).
- Carry out the design of NAMAs (Appropriate National Mitigation Actions) and NAPAs (National Adaptation Programs of Action) in the energy sector in the short term. The responsible actor is the MADES, with the support of the VMME.
- Implement a Monitoring – Reporting – Verification (MRV) system for GHG emissions in the national energy sector. The responsible actor is the MADES, with the support of the VMME.

2 Ensuring energy pricing and tariff structures that allow for the development of the sector, consumer protection and energy affordability

2.1 Energy efficiency in the use of biomass for households.

Priority targets:

- To have the energy services endowment program for social inclusion (2020) underway in the short term. The responsible actor: VMME.
- To have at least 7,500 stoves built in the short term, within the framework of the program to promote the use of efficient stoves. The responsible actors are the STP/FAO (PROEZA) and the VMME.

3 Strengthen the contribution of Binational Hydroelectric Power Plants to local development and productive innovation, within the framework of national development programs

3.1 Joint Coordination between the National Government and Binational Entities.

Relevant target:

- To have a mechanism, in place, of joint coordination between the National Government and Binational Entities, with emphasis on social projects. The responsible actors are the Binational Entities, the MIC, International Cooperation Agencies and the VMME.

4 Strengthen technical HR education and training in energy related topics

4.1 Environmental awareness and technical education of human resources in energy issues.
4.2 Training of officials in energy efficiency and management.
4.3 Inclusion of energy efficiency topics in the school curriculum.
4.4 Design and approval of the training program in demand management and related topics.

Priority targets:

- Develop strategies for changes in early, secondary and higher education, incorporating energy efficiency issues. The responsible actors are the Ministry of Education and Science (MEC) and the National Council for Higher Education (CONES), with the support of the VMME.
- To have a training program in demand management and related topics for institutions, service providers and industries, designed and approved in the short term. The responsible actors are the CNEE and the VMME.

Relevant target:

- Promote technical training of human resources in energy issues through outreach programs. The responsible actor is the VMME.

5 Consumer awareness and empowerment

5.1 Implementation of energy efficiency awareness campaigns
5.2 Promotion and development of information centers on energy efficiency.
5.3 Inclusive energy development based on gender equality and ethnic diversity.

Priority targets:

- To implement, in the short term, public awareness campaigns on energy efficiency issues. The responsible actors are the CNEE and the VMME.
- To have available and functioning Information Centers on energy efficiency for the consumer. The responsible actors are the CNEE and the VMME.

6 Promote the development of skilled human resources for the entire Hydrocarbon sub-sector

6.1 Training of PETROPAR officials and other actors in the Hydrocarbon sub-sector.

Relevant target:

- To implement a training program on technical and legal aspects related to prospecting, exploration and exploitation of hydrocarbons. The responsible actors are the VMME, PETROPAR and the MIC.

7 To encourage the empowerment of women within the energy sector

7.1 Merit-based recruitment of qualified staff
7.2 Incentives for the inclusion of women within the sector

Priority target:

- Implement incentive programs for STEM (Science, Technology, Engineering and Math) careers to attract more women The responsible actors are the MEC, the STP, the Ministry for Women and the VMME.

Relevant goals:

- To ensure transparency in income, salary distribution, and merit-based promotion in the public service among men and women in the energy sector. The responsible actors are the Ministry of Labor, Employment and Social Security (MTESS), the Ministry for Women and the VMME.
- To have spaces, at a departmental level, for professional empowerment and entrepreneurship programs in the energy sector for women. The responsible actors are the Ministry for Women, the STP and the VMME.

Paraguay de la gente